



Detecting Bad Posture using Postuino among Engineering Graduate Students



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Abstract

To understand how good posture minimizes computer related injury's pain, we developed Postuino. A device that warns the computer users if they are leaning too close towards computer screen. Postuino has an accompanying web application that visualizes the collected data and displays a chart to simplify comparing between straight time and slouch time. Also, the app suggests taking frequent breaks to minimize the risk of injuries and to increase productivity. Then, we designed an experiment with different factors to evaluate the efficiency of Postuino. In our study, 24 subjects first use the computer for 3 hours after disabling Postuino's alert system. Afterwards, they use the computer again for another 3 hours after enabling the alert system. We collected data, analyzed it, and presented the results in this paper.

Postuino

Postuino warns computer users if they are leaning too close towards the computer screen, by measuring the distance between the user and computer monitor in order to indicate if the user is leaning too close towards the computer monitor. Also, it provides excellent feedback for users about the time they spend sitting and slouching. This information can be used by the users themselves or their physicians or chiropractors for health monitoring purposes. The hardware used to make the prototype is demonstrated in the circuit design in Fig.1. Postuino data visualization tool called Plotly to convert data to graphical representation and present the resulting graphs on an accompanying web application for each specific user.

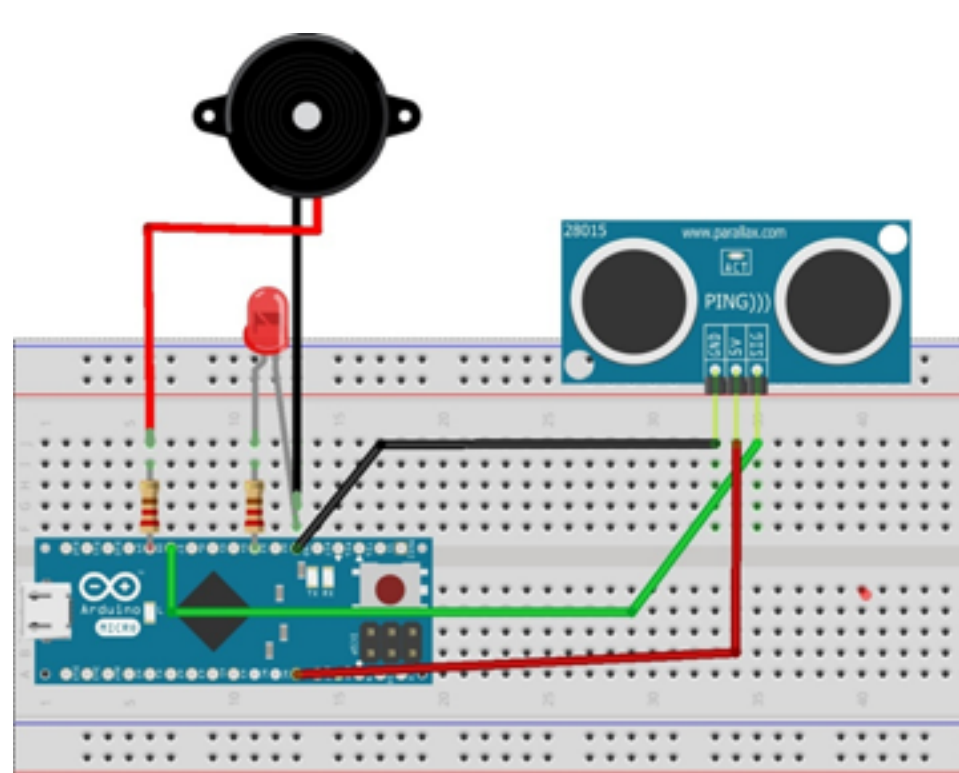


Fig. 1. Postuino Circuit Design

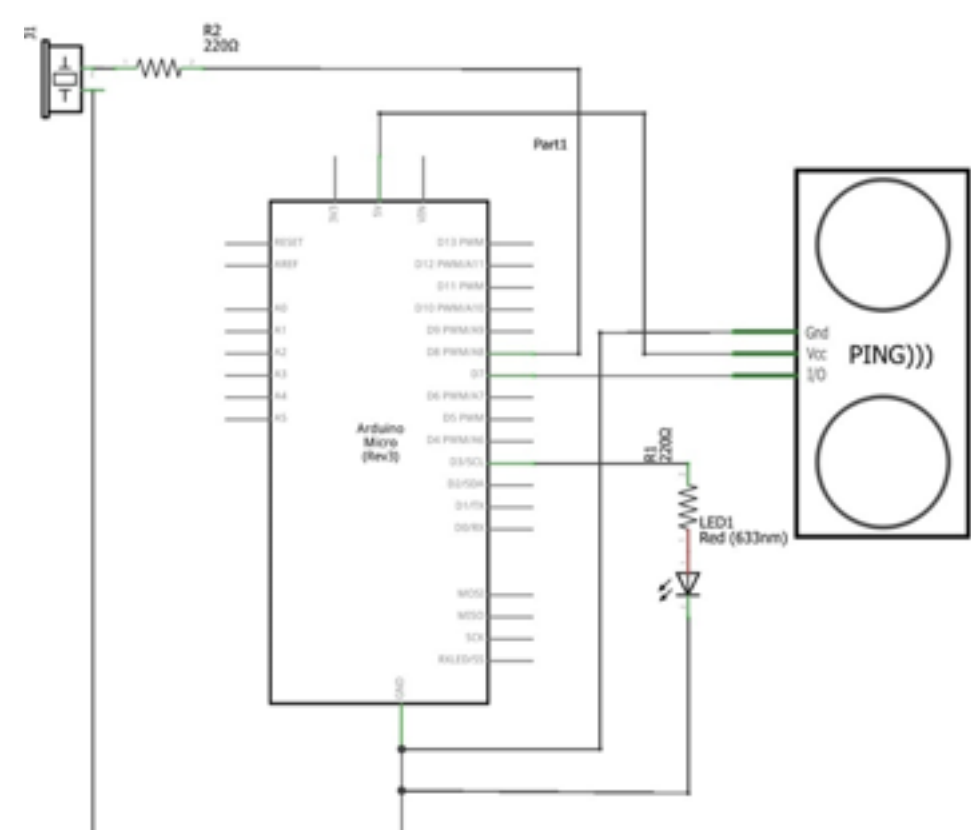


Fig. 2. Postuino Schematic

Experiment Design

In our study, we setup a workstation and mounted Postuino on top of the screen to record the elapsed time, including straight and slouch time. First, (N=24) subjects used the computer for 3 consecutive hours after disabling the alert system in Postuino in order to record the elapsed time, without alerting the user to correct the bad posture. Then, we repeated the first stage after enabling the alert system in Postuino as follows; alert contains light only, sound only, both light and sound. Finally, the second stage was repeated after re-positioning Postuino to take place next to computer monitor. We collected data using Postuino and a questionnaire.

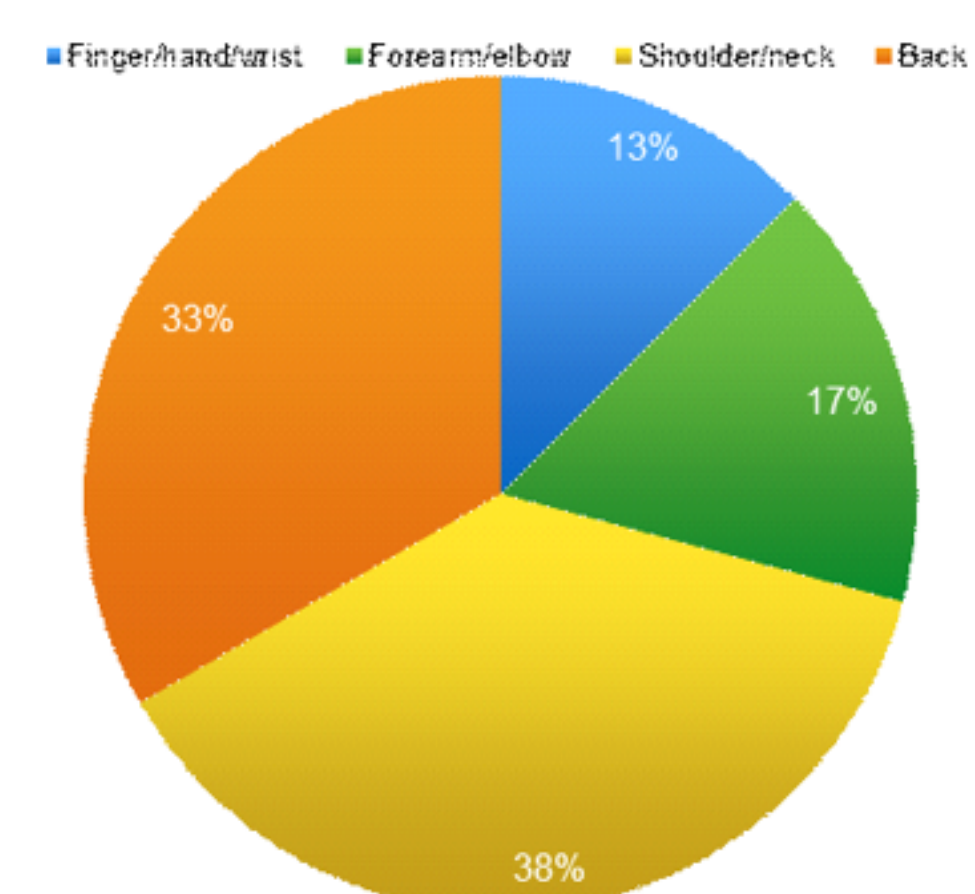


Fig. 3. Prevalence of Computer-related Injuries

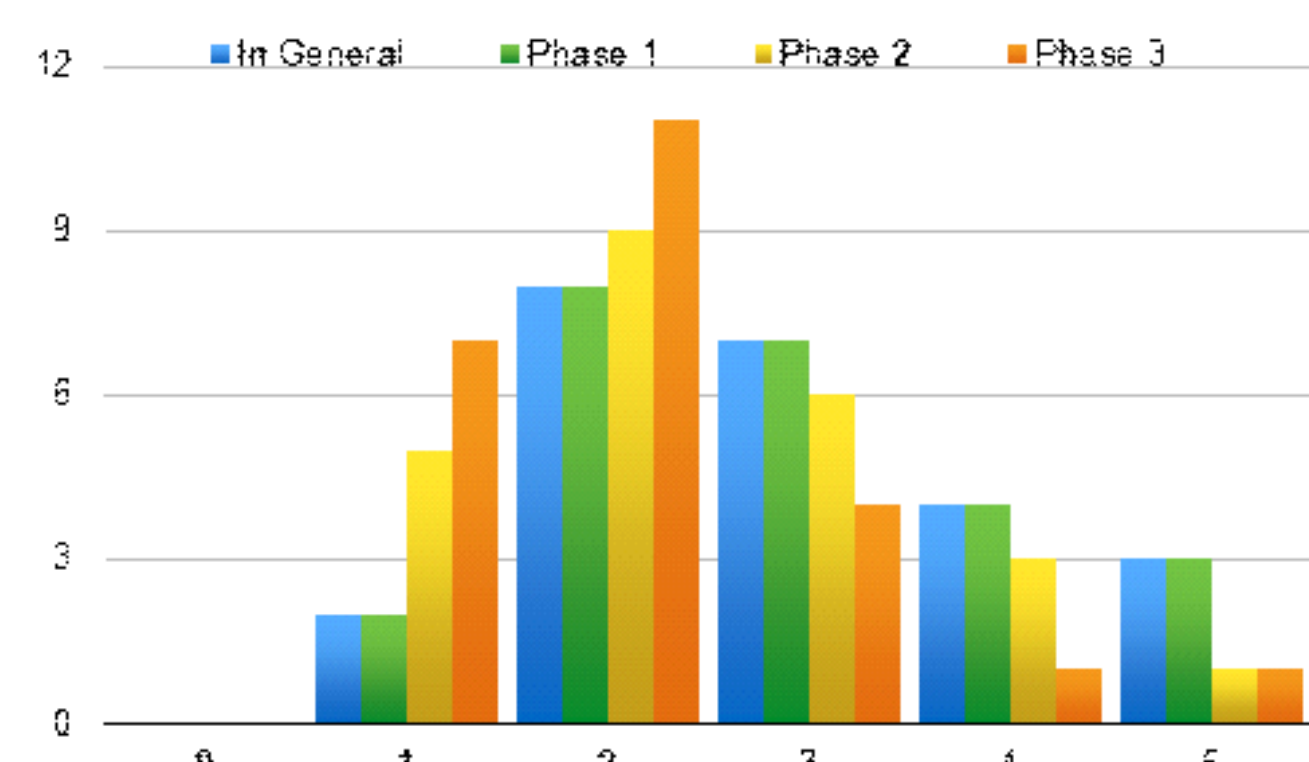


Fig. 4. Pain Level During Computing (In General and During Phase 1, 2, 3)

Conclusion

In our tests of Postuino's efficiency, we have been able to prove that improving the posture helps reducing muscle and joint pain that is related to computer use. From quantitative data, we can recommend the use of Postuino to detect bad posture and suggest frequent breaks that minimizes the risk of getting computer related in-juries.

Mounting Postuino on top of the screen gave better readings. However, users can position it next to the computer monitor depending on their personal preference. Also, enabling light alert only while disabling sound alerts allows users to use Postuino in public places for maximum benefit and better productivity.

References

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